REMARKS

The Amendments

Specification

The specification has been amended to clarify the structural cooperative relationship between the drilling medium and directional drilling means and no new matter has been added. In particular, the specification has been amended to clarify which component(s) of the directional drilling means is operated by the drilling fluid. Support for the amendments can be found throughout the specification and such support is described in more detail below.

Claims

The claims have been amended for clarification purposes. In particular, independent method claim 1 and independent apparatus claim 30 have both been amended to clarify that the directional drilling means has both a drill bit and either a downhole motor or an air hammer for operating the drill bit, and that the structural cooperative relationship is between the drilling medium and the downhole motor or air hammer, both of which operate the drill bit. Support for such amendments can be found throughout the specification as a whole, for example, see page 7, lines 11-14 and page 15, lines 2-3, and such support is described in more detail below.

Examiner's Objection to the Specification

Claims Rejections – 35 U.S.C. § 112

The Examiner states that the claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In particular, the Examiner states that the structural cooperative relationship between the drilling medium and directional drilling means forming the directional or horizontal wellbore is omitted.

Further, claims 1-58 were rejected under 35 U.S.C. § 122, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. Examiner further states that

the structural cooperative relationship between the drilling medium and directional drilling means forming the directional or horizontal wellbore is omitted.

Both the claims and the specification have been amended to clarify that the directional drilling means has a drill bit and either a downhole motor or an air hammer, and that the structural cooperative relationship of the drilling medium is with the downhole motor or air hammer, so that the downhole motor or air hammer can operate the drill bit. It is respectfully submitted that such structural cooperative relationship is taught in the specification in such a way as to enable a skilled person to make and/or use the invention and is thus not omitted and that the claims as amended now include the structural cooperative relationship between the drilling medium and the directional drilling means. Support for amendments to the claims and specification is discussed in more detail as follows.

By way of background, single wall coiled tubing has been used in the drilling industry for at least 25 years. One of the benefits of drilling with coiled tubing is the lower cost of coiled tubing units versus conventional workover rigs. However, unlike conventional drill string, which is comprised of individual joints of drill pipe, coiled tubing is a continuous length of tubing, which is wrapped around a giant reel or drum. Thus, coiled tubing cannot be rotated like drill pipe, for example, by using a surface rotary table or top drive. Therefore, when drilling with coiled tubing, a bottomhole drilling assembly is required which has a downhole motor, such as a mud motor, a positive displacement motor or an air hammer, that is powered by drilling medium to operate (*i.e.*, rotate or reciprocate) a drill bit. Such a requirement is well known in the art.

In the present invention, concentric coiled tubing drill string is used to drill a wellbore instead of single coiled tubing in order to prevent drill cutting from flowing into and damaging the formation. The drill cutting can then be removed either through the annulus of the concentric coiled tubing drill string or through the inner coiled tubing string, thereby preventing damage to the formation. As with single coiled tubing drill string, concentric coiled tubing drill string is also wrapped around a giant drum or reel (see FIG. 2) and therefore cannot rotate to operate a drill bit. Thus, as with single coiled tubing, it is also necessary to use downhole motors or air

hammers to operate the drill bit in order to drill the wellbore when using concentric coiled tubing.

The present specification teaches that the directional drilling means of the invention comprises, among other elements, either a downhole motor or an impact/air hammer (see, for example, page 7, lines 11-14). In one embodiment of the present invention, seen in FIG. 1a, the directional drilling means 04 comprises an impact or air hammer 80 and a drill bit 78, which drill bit is attached to the air hammer 80. FIG. 1a clearly shows drilling medium or fluid 28 being pumped through the concentric coiled tubing drill string to the impact hammer 80. The embodiment shown in FIG. 1a is further described on page 15, lines 31-33 and page 16, lines 1-3 as follows:

> Drilling medium 28 is pumped through concentric coiled tubing drill string annulus 30, through the bottomhole assembly 22, and into a flow path 36 in the reverse drilling means 04, while maintaining isolation from the inside of the inner coiled tubing string 01. The drilling fluid 28 powers the reverse-circulating drilling means 04, which drills a hole in the casing 32, cement 33, and/or hydrocarbon formation 34 resulting in a plurality of drill cuttings 38.
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> [Emphasis added]

It is respectfully submitted that a person skilled in the art would understand that the drilling fluid is in fact operating the air hammer, which in turn operates the drill bit to form the wellbore, and that the structural cooperative relationship is between the drilling medium and the air hammer. Air hammers are well known in the art and a person skilled in the art would understand how drilling medium operates an air hammer. By way of example, a reverse circulating reciprocating impact hammer is taught in U.S. Patent No. 3,795,283, which hammer is shown using concentric jointed drill pipe. The hammer of the '283 Patent, as is the case with most hammers, comprises a piston that reciprocates by fluid under pressure and strikes an anvil having a drill bit assembly secured thereto (see column 2, lines 41-47). The '283 Patent further discloses that the fluid under pressure may be drilling mud or air but under normal circumstances is usually air (column 2, lines 57-59).

A second embodiment of the present invention contemplates using conventional drilling tools that are used when drilling with single coiled tubing (see page 16, lines 27-28). For example, in FIG. 1b, conventional tools that are used with single coiled tubing are illustrated; in this embodiment, however, the bottomhole assembly further comprises an interchange means 67 to allow the drill cutting 38 to be removed through the center of the inner coiled tubing string 01, as the conventional tools are only single walled.

In a third embodiment of the present invention, conventional drilling tools used with single coiled tubing can be modified to provide for reverse circulation of the drilling fluid. The specification states at page 4, lines 7-12 as follows:

> The present invention uses existing coiled tubing directional drilling tools modified to provide for reverse circulation of drilling medium and produced fluids. For example, an outer casing can be provided for encasing existing directional drilling tools such that an annulus is formed between the outer wall of the tool and the inside wall of the outer casing.
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> [Emphasis added]

Examples of existing drilling tools that are used with single coiled tubing are disclosed in U.S. Patent Nos. 5,394,951 and 5,215,151, both of which were incorporated into the present application by reference (see page 3, line 1 and page 2, line 25, respectively). Thus, in the present invention, these existing drilling tools can be used either unmodified with an interchange means as shown in FIG. 1b or can be modified with an outer casing.

U.S. Patent No. 5,394,951 discloses a downhole motor for use with single coiled tubing. The '951 Patent teaches at column 3, lines 15-35 that a drill bit can be connected to either a stabilizer or directly to "a downhole turbine or motor 30 which uses drilling fluid flowing from the earth's surface through the drill string or coiled tubing 20 to rotate the drill bit 26". Thus, it is clear from the '951 Patent that the structural cooperative relationship between the drilling medium and the directional drilling means, which in this instance comprises a downhole motor and a drill bit, is between the downhole motor and the drilling medium.

The actual operation of motor 30 is described in more detail at column 5, lines 58-63 as follows:

> Mud pumps (not shown) at the earth's surface force drilling fluids downwardly within the coiled tubing 20 to the motor 30. The motor 30 is operated by drilling fluids moving axially over an internal rotor/stator assembly and converting hydraulic energy into mechanical energy resulting in bit rotation with high torque.

Thus, is was well known in the prior art that mud motors comprise internal rotor/stator assemblies and the like which can convert hydraulic energy generated by pumping drilling fluids from the earth's surface into mechanical energy to rotate a drill bit.

U.S. Patent No. 5,215,151 discloses a method and apparatus for directional drilling to recover hydrocarbons, thermal energy, or the like, by using single wall coiled tubing. Water is used in the drilling operation to operate a downhole motor and to flush cuttings from the borehole. In describing one embodiment of a downhole motor, the '151 Patent states at column 6, lines 61-68 to column 7, lines 1-4 as follows:

> For example, the motor 140 may be a positive displacement hydraulic motor which can be operated by the water or other hydraulic fluid. The motor 140 is connected to a bent housing section 142 through which a drive shaft (not illustrated) from the motor extends to drive a bit 144. The motor 140 is driven by being pumped through the swivel 68, tubing string 54, and all of the sections of the downhole string 22 to the motor 140 to finally exit through bit 144, then circulate back through the annulus to return through the diverter 90 and ultimately to pit 60.
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> [Emphasis added]

In summary, both the specification and independent claims 1 and 30 have been amended to clarify that in the present invention the directional drilling means has a drill bit and a downhole motor or an air hammer for operating the drill bit. It is respectfully submitted that a person skilled in the art, upon reading the specification, would understand how drilling medium

cooperates with the downhole motor or the air hammer to operate the drill bit, as these are downhole tools that are well known in the art.

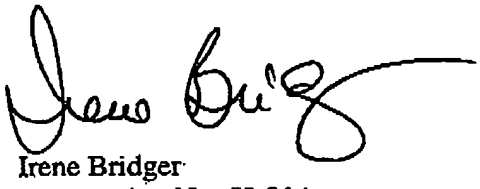
Drawings

The drawings are objected to under 37 CFR 1.83(a) as failing to show the structural cooperative relationship between the drilling medium and the directional drilling means forming the directional or horizontal wellbore.

The amended claims now recite that the drilling medium operates either a downhole motor or an air hammer, which downhole motor or air hammer operates the drill bit. FIGS. 1a and 1b clearly show drilling medium 28 in a structural cooperative relationship with air hammer 80 having drill bit 78 attached thereto. Thus, it is respectfully submitted that the drawings do not need to be amended.

In view of the arguments presented by Applicant herein, Applicant submits that the new claims of the present application are in a condition for allowance and such allowance is respectfully requested.

Respectfully submitted,



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